

REMARKS

INTRODUCTION

In accordance with the foregoing, claims 4 and 12 have been canceled, claims 1, 5, 8, 9, 13 and 16 have been amended, and no claims have been added. No new matter is being presented, and approval and entry are respectfully requested.

Claims 1, 5-9 and 13-16 are pending and under consideration. Reconsideration is respectfully requested.

EXAMINER INTERVIEW

Applicants thank the Examiner for the Examiner Interview that was conducted on January 27, 2006. Comments regarding the prior art rejections which were discussed are included below.

AUTOMATIC "SPECIAL" STATUS

The Applicants respectfully note that the present application has been pending for more than five (5) years. Accordingly, the Applicants respectfully acknowledge the consideration of the present application as "special" as mandated by MPEP 707.02.

REJECTION OF CLAIMS 1, 4-7, 9 AND 12-15 UNDER 35 U.S.C. §103

In the Office Action, at page 2, claims 1, 4-7, 9 and 12-15 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 4,507,042 issued to Suzuki et al. in view of U.S. Patent No. 4,602,345 issued to Yokoyama and further in view of U.S. Patent No. 5,770,936 issued to Hirai et al., and European Patent Document No. 0 672 496 by Nakano et al. The reasons for the rejection are set forth in the Office Action and therefore not repeated. Claims 4 and 12 have been canceled. Independent claims 1 and 9 have been amended. However, as the cited art may still relate to the present invention, this rejection is traversed for at least the reasons set forth below. Reconsideration is respectfully requested.

The Combination Fails to Teach or Suggest all the Features of Claims 1 and 9

Regarding claims 1 and 9, the Applicants respectfully submit that the combination of Suzuki, Yokoyama, Hirai and Nakano fails to teach or suggest either:

a cutting tool unit mounted on said wrist at a distal end of said movable arm, having a cutting effecting end point biased with a radial offset with respect to a final rotational axis of said wrist and directed to said final rotational axis, and a variable axis varying a position or a direction of said effecting end with respect to said final rotational axis of said wrist,

wherein said variable axis of the said cutting tool unit includes a linear axis (claim 1); or

A method of machining a cylindrical workpiece with a robot system comprising ... a cutting tool unit ... having ... a variable axis varying a position or a direction of said cutting effecting end with respect to said final rotational axis of said wrist, said method comprising:

- (a) arranging the workpiece so that a central axis of the workpiece is aligned with the final rotational axis of said wrist; and
- (b) selectively rotating only said final rotational axis to perform cutting machining on the workpiece,

wherein said variable axis of said cutting tool unit includes a linear axis (claim 9).

Claims 1 and 9 now clearly recite that the variable axis of the cutting tool unit includes a linear axis. The Applicants respectfully submit that claims 1 and 9, even in light of FIG. 2 of Hirai, patentably distinguish over the proposed combination.

The structure of the cutting tool is patentably distinct. During the interview, the Examiner has noted that an

inventive feature of the present application is the construction of the cutting tool disclosed in FIG. 3 in which the cutting tool can move... in [a] linear direction, and in FIG. 7 in which the cutting tool... can move... not only in a linear direction but also can be rotated.

Interview Summary, continuation sheet, lines 3-5. However, the Examiner also cautioned that FIG. 2 of Hirai is relevant to the construction of the cutting tool disclosed in FIG. 3 of the present application. See *Interview Summary*, continuation sheet, lines 7-12. The Applicants respectfully submit that FIG. 2 of Hirai shows a tool 23 attached to a tool post. FIG. 2 of Hirai appears to depict a variable linear axis of a tool post. In contrast, claims 1 and 9 recite a cutting tool unit that itself includes a variable axis including a linear axis. The Applicants respectfully submit that

this distinction is an important distinction. A tool unit having a construction that includes variable axis including a linear axis enables the cutting of an end of a pipe in a saddle shape and the forming of a hole on a side face of the pipe. Accordingly, the Applicants respectfully submit that the structure of the cutting tool is patentably distinct.

The Prior Art does not Provide a Suggestion or Motivation to Combine the References

The arguments in the December 29, 2005 Response with respect to the lack of a suggestion or motivation for the proposed combination of references are incorporated herein.

Claims 5-7 and 13-15 Are Allowable Due to their Dependencies

Regarding the rejection of claims 5-7 and 13-15, these claims depend directly from one of either independent claims 1 or 9, and are therefore believed to be allowable for at least the reasons noted above.

For at least these reasons, the Applicants respectfully submit that the combination of Suzuki, Yokoyama, Hirai and Nakano fails to establish a prima facie case of obviousness. Accordingly, claims 1, 5-7, 9, 13-15 deemed to be allowable over the art of record. Therefore, withdrawal of the § 103(a) rejection of claim 8 is respectfully requested.

REJECTION OF CLAIM 16 UNDER 35 U.S.C. §103

In the Office Action, at page 4, claim 16 was rejected under 35 U.S.C. §103(a) as being unpatentable over Suzuki in view of Yokoyama, and further in view of Hirai, and U.S. Patent No. 4,755,232 issued to Thones et al. The reasons for the rejection are set forth in the Office Action and therefore not repeated. Claim 16 has been amended. However, as the cited art may still relate to the present invention, this rejection is traversed for at least the reasons set forth below. Reconsideration is respectfully requested.

The Combination Fails to Teach or Suggest all the Features of Claim 16

The Applicants respectfully submit that the combination of Suzuki, Yokoyama, Hirai, and Thones fails to teach or suggest:

A method of machining a pipe-like workpiece with a robot system

comprising a movable arm including ... a tool unit ... having ... a variable axis for varying a position or a direction of said effecting end with respect to a final rotational axis of said movable arm, said method comprising the steps of:

- (a) arranging the workpiece so that a central axis of the workpiece is aligned with the final rotational axis of said movable arm; and
- (b) rotating said final rotational axis and driving said variable axis in synchronism with the rotation of said final rotational axis to perform a saddle-like cutting or forming a hole on the workpiece, wherein said variable axis of said tool unit includes a linear axis.

Claim 16 now clearly recites that the variable axis of the tool unit includes a linear axis. As discussed above, Hirai, at best only shows a tool 23 attached to a tool post that appears to depict a variable axis including a linear axis. Accordingly, the Applicants respectfully submit that the proposed combination of references fails to teach or suggest the method of machining as recited.

The Prior Art does not Provide a Suggestion or Motivation to Combine the References

The arguments in the December 29, 2005 Response with respect to the lack of a suggestion or motivation for the proposed combination of references are incorporated herein.

For at least these reasons, the Applicants respectfully submit that the combination of Suzuki, Yokoyama, Hirai and Thones fails to establish a prima facie case of obviousness. Accordingly, claim 16 is deemed to be allowable over the art of record. Therefore, withdrawal of the §103(a) rejection of claim 16 is respectfully requested.

REJECTION OF CLAIM 8 UNDER 35 U.S.C. §103

In the Office Action, at page 4, claim 8 was rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,570,920, issued to Crisman et al. in view of an article entitled "Dexterous Telemanipulation with Four Fingered Hand System" by Bruno M. Jau (hereinafter referred as "Bruno"). The reasons for the rejection are set forth in the Office Action and therefore not repeated. Claim 8 has been amended. However, as the cited art may still relate to the present invention, this rejection is traversed for at least the reasons set forth below.

The Combination Fails to Teach or Suggest all the Features of Claim 8

The Applicants respectfully submit that the combination of Crisman and Bruno fails to teach or suggest:

a tool unit mounted on a distal end of said movable arm, having an additional rotation axis biased with respect to a final rotational axis of said movable arm and an effecting end biased with respect to said additional rotation axis and directed to said additional rotation axis, and a variable axis varying a position or a direction of the effecting end with respect to the final rotational axis of said moveable arm,

wherein said variable axis of said tool unit includes a linear axis.

Claim 8 now clearly recites that the variable axis of the tool unit includes a linear axis.

Accordingly, the Applicants respectfully submit that the proposed combination of references fails to teach or suggest the method of matching as recited.

The Prior Art does not Provide a Suggestion or Motivation to Combine the References

The arguments in the December 29, 2005 Response with respect to the lack of a suggestion or motivation for the proposed combination of references are incorporated herein.

For at least these reasons, the Applicants respectfully submit that the combination of Crisman and Bruno fails to establish a prima facie case of obviousness. Accordingly, claim 8 is deemed to be allowable over the art of record. Therefore, withdrawal of the § 103(a) rejection of claim 8 is respectfully requested.

CONCLUSION:

In accordance with the foregoing, it is respectfully submitted that all outstanding objections and rejections have been overcome and/or rendered moot. And further, that all pending claims patentably distinguish over the prior art. Thus, there being no further outstanding objections or rejections, the application is submitted as being in condition for allowance which action is earnestly solicited.


If the Examiner has any remaining issues to be addressed, it is believed that prosecution can be expedited by the Examiner contacting the undersigned attorney for a telephone interview to discuss resolution of such issues.

If there are any underpayments or overpayments of fees associated with the filing of this Amendment, please charge and/or credit the same to our Deposit Account No. 19-3935.

Respectfully submitted,

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